

4 Broadband Cost Trade-Offs



Users must understand the financial impact of deploying and operating the nationwide network and potential business models.

By Joe Ross

The Middle Class Tax Relief and Job Creation Act of 2012 is a monumental achievement for public-safety communications. That act provides a governance body, the First Responder Network Authority (FirstNet), up to \$7 billion in funding and an additional 10

megahertz of spectrum to implement a nationwide broadband wireless network designed to public-safety requirements.

FirstNet, the states and public safety have equally significant challenges to capitalize on the opportunity. If there was an economic case for

public-safety-grade commercial service, it would already be available. And if there was a viable return on investment for sparsely populated rural areas, rural service would match that of denser populated regions. Unfortunately, this is not the case. The act also directs FirstNet to collect fees to offset all required expenses in carrying out its duties. Presumably, given state and local finances, the states would also insist on establishing a sufficient revenue stream to cover the service delivery expenses.

We need to aim high with this opportunity. A handful of users from each agency using the network would be unacceptable. Pursuing a network that doesn't fully deliver on the promise of this prospect is unacceptable. Providing broadband service to a larger user population to benefit from this network than is using commercial broadband services should drive the initiative. The goal should be that those users have access to more applications that enhance public-safety services.

However, the business case for achieving the requirements of the ultimate solution is extremely challenging. The entire public-safety community needs to approach this endeavor with eyes wide open regarding the trade-offs. Public safety is unlikely to "have it all;" therefore, it is essential to prioritize the most important objectives. Funding and spectrum must be managed for maximum advantage. Because fixed capital and operating budgets underlie the adoption and success of the network, it is critical that public safety understands how the financials impact the affordability of the service.

There are a variety of ways FirstNet and the states could approach the solution. Following are four considerations that must be determined for the business model:

1. There are multiple service delivery methods. The delivery solutions don't have to be uniform across the country. The

solution for urban areas can differ from rural areas because of their diverse environments and needs.

2. Multiple types of partners can affect the service delivery methods. The service could be delivered differently if the primary partner is a utility compared with a commercial carrier.

3. Different types of business arrangements impact who owns the financial risk. For example, FirstNet or the states could engage a vendor to provide service on a fee-for-use basis, or a vendor could be engaged to provide network operations at a fixed fee.

4. There are various mechanisms and options for fee collection. The network operator can collect user fees from public-safety entities, as well as from secondary use of the spectrum and from leasing infrastructure.

Essentially, various combinations could make up the business model. The options are inter-related. Some options may result in less-than-ideal operational scenarios that could stifle service adoption or its benefits. Other options may result in higher operational costs and prevent access to many public-safety agencies. Ultimately, it is not possible to determine the ideal business model until public safety fully understands its requirements and the private enterprise offerings.

1. Service Delivery Methods

Long Term Evolution (LTE), the global standard for next-generation mobile broadband technology, was selected as the standard for the public-safety network. The law is clear that FirstNet will provide the core network, but either FirstNet or the state will provide the radio access network (RAN) and cell sites. There are many ways to leverage LTE, and the law contemplates roaming arrangements with commercial networks that may include alternative technologies, such as 3G wireless standards. Fundamentally, the commercial networks have limited service in many rural areas because there is little return for the investment.

In its 16th annual report on competitive market conditions, the FCC found the commercial carriers served 74.3 percent of the area of the country

and 99.9 percent of its population. Rarely do you see the coverage requirements for LMR networks based on population because public safety's operations routinely go beyond the density of the population. Critical infrastructure can be located outside of populated areas and crime knows no borders. The scope of where service is needed has major impacts on how the service should be delivered. Sam Ginn, FirstNet's chairman, says the board intends to deliver service to every square meter of the country, including parking garages. This is a monumental challenge.

FirstNet could choose to provide only terrestrial service where a single nationwide commercial carrier offers service. And because the nationwide carriers have dramatically different individual footprints, the scope of coverage could be substantially different. According to broadbandmaps.gov, Verizon Wireless serves 1.33 million square miles while T-Mobile serves 281,473. Both carriers have roaming agreements with others that altogether serve the 74.3 percent of the United States, however, they don't control these roaming partners, and therefore, cannot necessarily deliver custom public-safety services in those areas. If the services are delivered using commercial spectrum and not provided over public safety's spectrum, it's possible that public safety would not receive the priority service it requires.

FirstNet has also presented alternative broadband service delivery methods. For example, satellite services were identified to be an integral component of the plan. Satellite offers reliability and coverage benefits, but unfortunately has limitations. Additionally, there are multiple types of satellite services to consider, each with their own advantages and challenges.

Where terrestrial service is provided, the type and ownership of the assets impact the construction and operational costs, as well as the survivability of the network. The law calls for FirstNet to leverage both commercial and public-safety assets. Use of commercial assets will have synergies with commercial carrier partners. The

carriers have equipment installed at their cell site locations. Relocating that equipment is costly. Public safety also has considerable assets. Because public safety often builds its infrastructure to a higher standard, those sites are likely to be more hardened or survivable. In addition, use of those sites may reduce the overall taxpayer burden. In the end, both public-safety and commercial sites will be used, but which sites serve as the foundation of the nationwide network can dramatically impact the capital and operating costs. The commercial carriers themselves generally lease their tower sites. So there's no "free ride" for FirstNet or a commercial carrier to employ these facilities into the network. The owner tower companies must be compensated for the improvements to their sites to use the public-safety spectrum.

Other factors, such as how the service will be marketed and sold, also affect the net cost. Additionally, retaining customers and the associated cost for providing customer service also impact the business model. FirstNet and the states cannot ignore these elements of the business, and the financial models must accommodate the cost associated with securing, collecting and retaining the revenues required to sustain the service.

2. Partnership Options

The commercial cellular carriers are addressed specifically in the law for roaming, and they have significant assets and resources for delivering public-safety services using the public-safety spectrum. Carriers have cell sites, backhaul, technicians, engineers, operations support systems and other attributes that can help deliver the final solution. However, based on the failure of the D block auction, their participation in delivering public-safety operational requirements is not guaranteed. It is not clear if carriers are willing to meet public safety's requirements.

In fact, because FirstNet has not yet completed its consultation with the states as required, public-safety service conditions are not fully defined. As a result, it is unclear what the requirements may be and how the private

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partners can deliver them. Public safety's knowledge of the service delivery and economic challenges may help the states prioritize requirements. Until then, public safety needs to keep its options open and consider alternative partners to deliver the objectives.

Utilities have expressed an interest in becoming a partner and have considerable assets nationwide. While the commercial carriers can choose not to serve remote communities, the utilities generally extend service into rural communities. As a result, their asset footprint is considerable. In addition, they have similar needs for mission-critical communications. Utilities are important components of our critical infrastructure and are active participants in emergency response. In other words, they represent a user base that is important to public safety and public officials. The utilities also have unmet needs for guaranteed wide-area communications for which a public-safety-grade network is uniquely suited. The utility could then barter enhanced wireless services in exchange for the use of these assets.

Public-safety agencies are an important partner in the process. For example, if an agency offers its assets in exchange for services on the network, that agency is more likely to remain on the network and maximize its participation. That agency will feel more like a partner to the service provider than if it is solely an end user. And governments across the country may have additional funds that they are willing to invest to enhance local network capabilities.

3. Business Arrangements

The business arrangement options vary and can significantly impact the outcome. FirstNet or a state could choose to hire a vendor to operate the network at a fixed price. In this case, FirstNet or the state owns the responsibility to capture sufficient users or

other service fees to cover that cost. The business model must fund the "losses" until the user fees recoup these costs. In the case of fixed-network operational costs, the initial losses could be substantial. However, a fixed-cost model could result in "out year" flexibility to reduce the per-user fees and to facilitate investment in network growth or upgrade.

On the other hand, the business arrangement could be user fee based. For example, a mobile network operator (MNO) could offer FirstNet wholesale RAN services and charge FirstNet by the number of users, amount of use or some combination of the two. In this case, the MNO owns the financial risk to deliver sufficient users to the network to recover its costs. FirstNet could extend this to cover other operational functions such as billing, sales and marketing, and customer care, alleviating itself from most of the financial risk.

4. Revenue Models

There are also multiple revenue generation models that influence how service is sustained. The MNO business arrangement affects FirstNet or the state's participation in the revenue distribution. In addition, the services offered and the total population of feasible users will likely vary. And the degree to which the network is used for secondary users via the covered leasing agreements can also vary. The secondary use could cover a limited number of subscribers, such as utilities and other government users, as well as a cellular carrier's existing users or new wholesale users supported through the act's covered leasing agreements.

Recent accounts of the total public-safety population vary anywhere from 3 million to 14 million individuals. The 2011 census of state and local government employees shows more than 800,000 police protection; 300,000 fire

protection; 250,000 corrections; and more than 240,000 health full-time equivalent (FTE) employees, including EMS. Overall, the census reflects nearly 12 million total FTE state and local employees, but the plurality of those employees are educators.

The census also indicates more than 2.8 million federal employees with a plurality, and more than 800,000 involved in national defense and international relations. With many of these employees working in foreign lands, it's unclear to what extent they could be subscribers on the nationwide network. And many employees don't have government-funded voice or data wireless devices.

There are also an estimated 800,000 volunteer firefighters, many of whom are not government employees. These individuals are likely to be harder to capture as users on the nationwide network. Because they may make up the majority of the public-safety users, they represent a tremendous opportunity for FirstNet and the states both in terms of benefit and revenue generation. Many agencies employ mobile data computers or broadband-connected devices for each vehicle or unit. The first responders associated with those units may have access to the FirstNet network, but handheld devices can provide additional benefits, and these handheld devices are funded both by governments and individuals.

At the same time, enterprise contracts and family plans are moving more to usage-based models with less dependence on the number of lines. These trends in addition to potential reductions in competitive service costs can influence the revenue model and the number of subscribers of the service. And similar to carriers, FirstNet and the states can monetize value-added services like voice, text messaging and hosted applications.

The revenue models regarding covered leasing arrangements for

secondary use present potentially lucrative income opportunities. It's possible that FirstNet or the states could allow the MNO low-cost, or potentially no-cost, access to the excess capacity in exchange for lower or no-cost public-safety services. The user community for secondary access can vary widely. Major carriers with 100 million customers can easily leverage the network's secondary capacity. Other government agencies and utilities may represent a captive audience as secondary users; however, they would likely have lower use and therefore lower revenue potential than the public. The revenue model must also consider subscriber devices. A public-safety agency may not accept paying full price for devices and a comparable cost to subsidized service. If agencies cover the full cost of devices, they may expect reductions

White Paper

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in service costs that could result in lower FirstNet revenues.

Final Thoughts

There are a variety of ways to deliver required broadband service, to formulate private partnerships, to secure fundamental vendor goods or services, and to capture fees and revenues essential for operating the nationwide broadband network. The challenge lies in finding the optimal model that balances available money against operational objectives. The law provides public safety with a tremendous opportunity to

revolutionize mission-critical communications. It is critical that public safety articulates requirements that consider available funding and partnership options, and that all parties collaborate to identify the best solutions to capitalize on this opportunity. ■

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